

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D U 7 NOV 2005

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Applicant's or agent's file reference 58741WO003		<b>FOR FURTHER ACTION</b>		See Form PCT/PEA/416
International application No. PCT/EP2004/007928		International filing date (day/month/year) 16.07.2004	Priority date (day/month/year) 17.07.2003	
International Patent Classification (IPC) or national classification and IPC A61K6/10				
Applicant 3M ESPE AG				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 4 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (Indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand  04.02.2005		Date of completion of this report  08.11.2005		
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer  Böhm, I  Telephone No. +31 70 340-1050		



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/007928

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**Box No. I Basis of the report**

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1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-20 as originally filed

**Claims, Numbers**

1-14 received on 04.02.2005 with letter of 04.02.2005

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/007928

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes: Claims	1-14
	No: Claims	
Inventive step (IS)	Yes: Claims	1-14
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-14
	No: Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

Reference has been made to the following documents:

D1: US-A-4 600 766 (MASUDA ISAO ET AL) 15 July 1986 (1986-07-15)  
D2: DE 197 53 456 A (ESPE DENTAL AG) 10 June 1999 (1999-06-10)

**I) Novelty [Article 33(1) and (2) PCT]**

1.

D1 discloses a composition of a catalyst paste.

Polyether polyols such as polypropylene glycols or mixed polyetherols with tetrahydrofuran and/or ethylene oxide and/or propylene oxide units, polyester polyols such as polycaprolactone diols and polycaprolactone triols, polycarbonate diols, aliphatic esters, oils, fats, waxes, aliphatic hydrocarbons, aliphatic hydrocarbons and mono- or multifunctional esters of polyvalent acids such as phthalic acid or citric acid or esters or amides of alkylsulphonic acid and arylsulphonic acids are used as inert diluent (see p.3, paragr.34)

The composition is used for dental impression material for two-component formulations on the basis of aziridino group containing polyethers. The setting time achieved is between 2 and 4 minutes.

D1 does not disclose mono-N-alkyl-/ mono-N-aryl sulfonic acid amides. The general disclosure of amides of alkylsulfonic acids and arylsulfonic acids in D1 cannot be novelty destroying for the special sulfonamides of the present application.

Therefore the subject-matter of present claims 1-14 namely the dental composition, a kit comprising said composition, the method and the use of said composition has been considered as novel in the sense of Article 54 EPC.

**II) Inventive step [Article 33(1) and (3) PCT]**

2.

D1 has been considered as the closest prior art disclosing a composition of a catalyst paste.

3.

The **difference** between the state of the art, D1 and the subject-matter of the present invention is the fact, that D1 does not explicitly mention the use of primary and secondary sulfonic acid amides, having the structural element  $\text{SO}_2\text{-NH-}$ , as a functional group of component B in the dental composition.

4.

The objective **problem** of the present invention to be solved is the provision of a dental composition with a shortened working time.

5.

The **solution** given by the applicant is a dental composition with the features specified in claims 1, namely :

- a N-alkyl aziridine polyether as component A
- a  $\text{SO}_2\text{-NH}$  group containing component B, comprising aryl sulfonic acid amides and/or alkyl sulfonic acid amides
- an initiator C, which starts the curing process

The solution provided by the present application is also provided by the kit comprising said composition.

6.

The **effect** of using only primary and secondary sulfonic acid amides results in the improved properties of accelerated speed of cure compared to dental compositions for cure comprising N,N-substituted sulfonic acid amides having the structural element  $\text{SO}_2\text{-NR}_2$ . (with  $\text{R}\neq\text{H}$ )

7.

The solution to this problem is **not obvious** for a person skilled in the art with regard to D1. D1 does neither suggest or anticipate using specific sulfonic acid amides in order to achieve speed cure.

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

**PCT/EP2004/007928**

Furthermore D1 disregards the N-substituted sulfonic acid amides and considers them as "inert diluents". (see D1, paragr. 34)

Therefore the subject-matter of claims 1-14, respectively the dental composition, the kit therefore, the method and the use has been considered as involving an inventive step.

## Claims:

1. Dental composition comprising with respect to the cured composition

5 N-alkyl aziridine polyether as component A,

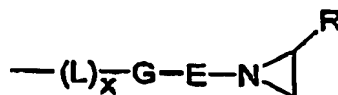
SO<sub>2</sub>-NH group containing component B  $\langle - \rangle$ ,

initiator C, *being able to start the curing process*

*cf. originally  
first claim 4.*

optionally additives D comprising modifiers, fillers, dyes, pigments, thixotropic  
agents, flow improvers, polymeric thickeners, surfactants, odorous  
10 substances, diluting agent(s) and flavourings.

2. The composition according to claim 1, wherein component A comprises a  
structure element represented by the following formula



15 wherein

R represents H, C<sub>1</sub>-C<sub>12</sub> alkyl, C<sub>2</sub>-C<sub>12</sub> alkenyl, C<sub>2</sub>-C<sub>12</sub> alkynyl, C<sub>7</sub>-C<sub>15</sub> alkylaryl,  
C<sub>7</sub>-C<sub>15</sub> arylalkyl, C<sub>3</sub>-C<sub>12</sub> cycloalkyl, and wherein hydrogen atoms may be  
replaced by Cl or F and/or wherein up to five carbon atoms may be replaced  
by atoms or group of atoms selected from O, CO, N, S,

20 E represents a C<sub>1</sub> - C<sub>18</sub> branched or unbranched hydrocarbon chain wherein  
up to five carbon atoms may be replaced by atoms or group of atoms selected  
from O, CO, N, S,

G represents a group selected from C(O)O, C(O)NR, C(O), C(O)C(O),  
C(O)(CH<sub>2</sub>)<sub>m</sub>C(O) with m = 1 to 10, C(S)NR, CH<sub>2</sub>,

25 L represents O, S, NR with x = 0 or 1.

3. The composition according to anyone of the preceding claims comprising  
component B in an amount of about 0,01 % by weight to about 20,00 % by  
weight.

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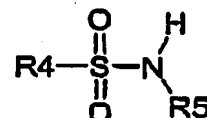
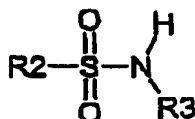
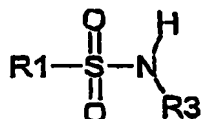
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~~4. The composition according to anyone of the preceding claims wherein component B comprises aryl sulfonic acid amides and/or alkyl sulfonic acid amides~~

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4 5. The composition according to anyone of the preceding claims wherein component B comprises N-alkyl or N-aryl substituted aryl sulfonic acid amides and/or N-alkyl or N-aryl substituted alkyl sulfonic acid amides.

105 6. The composition according to anyone of the preceding claims, wherein component B is represented by at least one of the following formulas:



15

wherein

R1 represents C<sub>1</sub>-C<sub>22</sub> alkyl, C<sub>2</sub>-C<sub>22</sub> alkenyl, C<sub>2</sub>-C<sub>22</sub> alkynyl, C<sub>7</sub>-C<sub>22</sub> arylalkyl or C<sub>3</sub>-C<sub>22</sub> cycloalkyl, and wherein one or more hydrogen atoms may be replaced by Cl or F and/or up to five carbon atoms may be replaced by atoms or group of atoms selected from O, CO, N, S,

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R2 represents C<sub>6</sub>-C<sub>18</sub> aryl, C<sub>7</sub>-C<sub>22</sub> alkylaryl, C<sub>2</sub>-C<sub>22</sub> cycloalkylaryl, C<sub>7</sub>-C<sub>22</sub> alkenylaryl or C<sub>7</sub>-C<sub>22</sub> alkynylaryl, wherein one or more hydrogen atoms may be replaced by Cl or F and/or up to five carbon atoms may be replaced by atoms or group of atoms selected from O, CO, N, S,

R3 represents H, R1 or R2.

25

R4 is R1 or R2,

and R5 represents the chemical linkage to a polymer.

- 6 7. The composition according to anyone of the preceding claims, wherein the molecular weight of component B is in the range of 90 to 2000 g/mol<sup>1</sup>.
- 2 8. The composition according to anyone of the preceding claims, wherein  
5 component B comprises benzene sulfonic acid N-butyl amide or p-toluene sulfonic acid N-ethyl amide, o-toluene sulfonic acid N-ethyl amide, benzene sulfonic acid amide or a mixture of o-/p- toluene sulfonic acid N-ethyl amide.
- 7 9. The composition according to anyone of the preceding claims, wherein initiator C  
10 is selected from the group of protonating or alkylating agents or wherein the initiator C generates protons and/or reactive alkylating agents in a chemical reaction.
- 9 10. The composition according to anyone of the preceding claims having a working  
15 time at 23 °C of equal or less than 3:30 min according to DIN EN ISO 4823:2000 and/or an oral setting time of equal or less than 3:30 min .
- 10 11. Kit of parts, comprising a base and a catalyst part, wherein the base part  
20 comprises component A, the catalyst part comprises component C, and wherein component B is present either in the base part or the catalyst part or in the base part and the catalyst part, wherein components A, B and C have the meaning as defined in the preceding claims.
- 11 12. Kit of parts, wherein the base part comprises component A, the catalyst part  
25 comprises component C, and wherein component B is comprised in a further part and neither comprised in the catalyst part nor in the base part, wherein components A, B and C have the meaning as defined in the preceding claims.
- 12 13. Method of producing a dental composition according to one of the claims 1 to 10  
30 comprising the steps a) providing components A, B and C, b) mixing the components.

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24

13 14. Use of a component B containing composition for enhancing the speed of set of a component A and C containing dental composition, wherein components A, B and C have the meaning as defined in the preceding claims.

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14 15. Use of the composition according to anyone of claims 1 to 9 or the kit of parts according to claim 10 or 11 for modeling of objects or body parts, preferably as dental impression, bite registration or dental duplicating material.

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